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THE OLIGOCENE OF
SOUTH DAKOTA

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TWO NEW FOSSIL BIRDS FROM THE OLIGOCENE OF SOUTH DAKOTA

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In the season of 1940 a joint expedition of the National Geographic Society and the South Dakota State School of Mines made detailed explorations for vertebrate fossils in the Oligocene deposits found in Washington County, S. Dak., in the Pine Ridge Indian Reservation. The party was under the leadership of Dr. James P. Connolly, with Dr. James D. Bump in charge of the exploration and collecting, assisted by Prof. Arthur C. McIntosh, assistant professor of biology, with Mahlon Binder, Thomas Blackstone, Blair Molander, Curtis Graversen, and Merle Crew as technical assistants, the latter being students carrying major studies in geology in the State School of Mines. Desmond Yetter, another student, was camp assistant. The results of the work were exceptionally fruitful, and included certain bones of birds which are here described.

According to data furnished by Dr. Connolly and Dr. Bump the bird material was collected in a small area including the west half of T. 41 N., R. 42 W., and the eastern tier of sections in T 41 N., R. 43 W. The locality is about 25 miles southeast of Scenic, and about 6 miles east of Rockyford. The bird material comes from the Brule formation of the Oligocene, having been obtained in the areas and deposits of Protoceras Channel sandstone found in the Leptauchenia clays. The specimens serve as an important contribution to our knowledge of the bird life of the North American Oligocene, a field in which until very recently comparatively little has been known.

The field work was financed by a grant from the National Geographic Society in connection with the program of scientific research of the Society.

Drawings illustrating this report have been prepared by Sydney Prentice.

Family ARAMIDAE. Limpkins

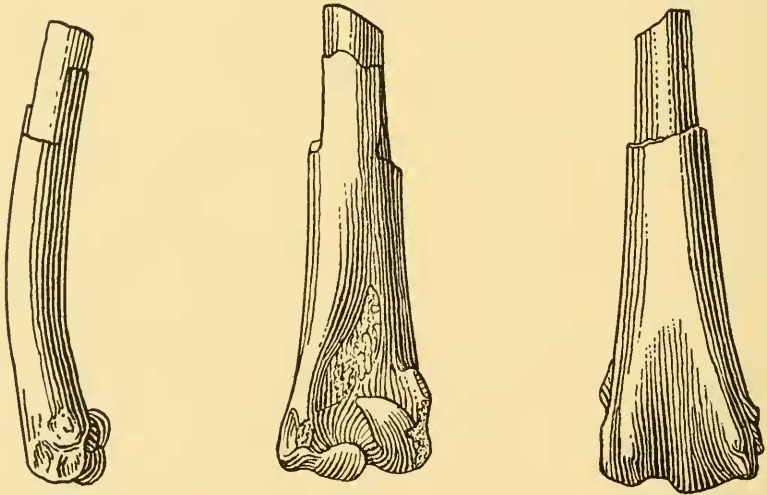
GNOTORNIS ARAMIELLUS, new genus and species

Characters.—Distal end of humerus (figs. 1-4) similar to that of modern *Aramus scolopaceus* (Gmelin),¹ but entepicondylar area

¹ *Ardea scolopacea* Gmelin, Syst. Nat., vol. 1, pt. 2, 1789, p. 647.

projecting only slightly laterally; ectepicondylar area relatively larger.

Description.—Type, distal end of left humerus, Cat. No. 40158, Museum of the South Dakota State School of Mines, Department of Geology and Mineralogy, from the Protoceras Channel sandstone of the Leptauchenia clays, Brule beds, Upper White River Oligocene,



FIGS. 1-4.—Four views of the type specimen of *Gnotornis aramiellus*, twice natural size.

25 miles southeast of Scenic and 6 miles east of Rockyford, Washington County, S. Dak., collected by the National Geographic Society—South Dakota State School of Mines Paleontological Expedition of 1940.

Distal section of shaft relatively strong, decidedly flattened, curved slightly forward at the lower end, and only slightly expanded to support the distal part of the bone, in cross section a much flattened ellipse; brachial depression of good size and distinctly impressed;

radial trochlea compressed, elevated, with upper margin undercut, being a relatively narrow plate, somewhat narrower toward its upper, elevated, free point where it has a slight inward flexure; ulnar trochlea relatively small, rounded; olecranal depression broad, shallow and open; ectepicondylar process (imperfect) projecting slightly outward; entepicondyle projecting little laterally beyond level of side of shaft, when viewed from the side showing a rounded distal margin; attachment for anterior ligament relatively small and flat, placed on a raised ridge. Bone light grayish brown.

Measurements.—Transverse width across trochlea 10.4, least transverse breadth of shaft 5.7, thickness of shaft at this point 4.2 mm.

Remarks.—This species makes the third of its family known in the fossil state, the other two being *Badistornis aramus* Wetmore from the Brule beds of the Oligocene of South Dakota, and *Aramornis longurio* Wetmore from the early Middle Miocene of Nebraska. The two just mentioned are known from the lower limb only so that comparison with them of *Gnotornis aramiellus* described from part of the humerus is difficult. In an earlier account² I have stated that *Aramornis* is more like modern *Aramus* and that *Badistornis*, while belonging with the limpkins (family Aramidae), offers some approach to the cranes (family Gruidae), seeming to point to a line of common origin between the two families mentioned.

The partial humerus that forms the type of *Gnotornis aramiellus* is distinct from both Gruidae and other Aramidae in the restriction of the entepicondylar area, seeming in this to stand so much apart as to make it necessary to place it in a distinct genus. It is notable for its small dimensions, having been apparently only about one-third the size of other known limpkins, living and fossil. It is a notable find therefore among fossil birds, being of a group in its family of which hitherto there has been no hint.

Family BATHORNITHIDAE. Bathornithes

BATHORNIS GEOGRAPHICUS, new species

Characters.—Metatarsus (figs. 5-9) generally similar to that of *Bathornis veredus* Wetmore³ but with middle trochlea definitely stronger and heavier; bladelike posterior projection of the inner trochlea with lower edge of the distal margin nearly on a line with the

² Wetmore, A., Journ. Morph., vol. 66, 1940, pp. 33-34.

³ *Bathornis veredus* Wetmore, Proc. Colorado Mus. Nat. Hist., vol. 7, No. 2, July 15, 1927, p. 11, figs. 19-24 (Chadron deposits of the Oligocene, Horsetail Creek, Weld County, Colo.).

distal margin of the body of the trochlea, instead of being elevated to project near the middle.



FIGS. 5-9.—Five views of the type specimen of *Bathornis geographicus*, partly restored, natural size.

Description.—Type, partly complete left tarsometatarsus, Cat. No. 4030, Museum of the South Dakota State School of Mines, Department of Geology and Mineralogy, from the Protoceras Channel

sandstone of the Leptauchenia clays, Brule beds, Upper White River Oligocene, 25 miles southeast of Scenic and 6 miles east of Rockford, Washington County, S. Dak., collected by the National Geographic Society—South Dakota State School of Mines Paleontological Expedition of 1940.

Proximal end of bone with a high intercondylar tubercle that rises from the anterior margin and slopes posteriorly, separating the two glenoid facets, an indistinct groove running transversely across the upper surface at its highest point; both glenoid facets elliptical in form with raised margins; talon with base broad; outer head indicated by a slight ridge; inner head strong and heavy, with indication of a single tendinal perforation, merging posteriorly through a thin, constricted ridge with the shaft near its upper third; posterior face of shaft with a shallow groove delimited by sharply angular edges; shaft at the proximal end below the head with a distinct depression which continues down in a broad anterior groove; shaft strong in spite of its length, flattened and expanded at the lower end; middle trochlea very strong and heavy, with a pronounced groove around its free margin; inner trochlea with inner and outer faces deeply concave, a faint groove around the free margin, and its platelike process having the distal margin on a line with the distal edge of the trochlea; outer trochlea fragmentary, showing only the posterior section, its external margin produced slightly. Bone light grayish brown in color.

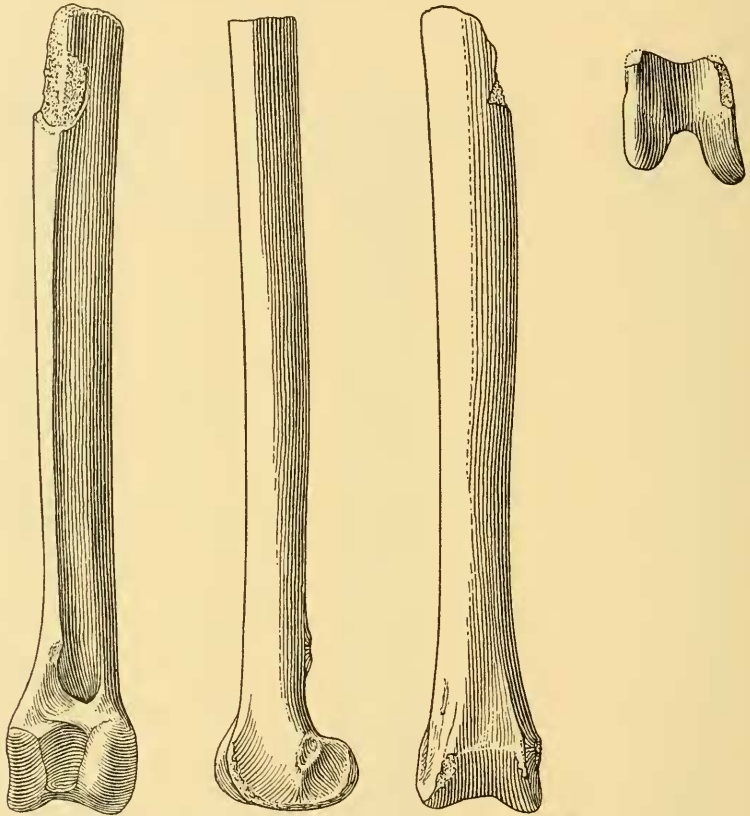
Measurements.—Total length (approximate) 120, transverse diameter of head 20.4, least transverse diameter of shaft 9.0, transverse diameter across trochlea (approximate) 21.0 mm.

Remarks.—This bird evidently is representative of *Bathornis veredus* of the Chadron beds, differing from that species in the material at hand so little as to make it appear certain that it is in the line of direct descent from the older form. The upper part of the metatarsus is unknown at present in *B. veredus*, but it has been interesting in this connection to compare the smaller *B. celeripes* of which abundant material has been found. The differences from *celeripes* shown by *geographicus* are those of decidedly larger size and more robust form, the two species having the metatarsus in outline closely similar. There is no mistaking their affinity when the two are examined side by side, the contours being almost identical.

A left tibiotarsus (figs. 10-13) lacking the head, with the shaft somewhat damaged, was found associated with the metatarsus and belongs evidently to the same individual. It is cataloged under the same number (4030). It agrees in general with the tibiotarsus in the collection of Princeton University that I have identified as

Bathornis veredus,⁴ but has the inner condyle relatively larger and thinner and the intercondylar groove larger. The bone itself is very slightly smaller, measuring 16.5 mm. transversely across the condyles as against 18 mm. in the Princeton specimen.

The specific name *geographicus* is given to commemorate the interest of the National Geographic Society in the explorations that led to the discovery of this interesting bird. The Bathornithes form a



FIGS. 10-13.—Four views of the tibia-tarsus of *Bathornis geographicus*, partly restored, natural size.

group, now wholly extinct, that seemingly was found throughout the Oligocene. The four known species are as follows:

Bathornis veredus Wetmore, Chadron; known from Weld County, Colo., near Crawford, Nebr., and from Pennington County, S. Dak.

Bathornis celeripes Wetmore, Brule; known from near Torrington, Wyo., and 12 miles northwest of Crawford, Nebr.

Bathornis cursor Wetmore, Brule; near Torrington, Wyo.

Bathornis geographicus Wetmore, Brule; from Washington County, S. Dak.

⁴ Condor, 1937, pp. 256-257.